Energy in the Broader Context of the Total Productivity of the Economy

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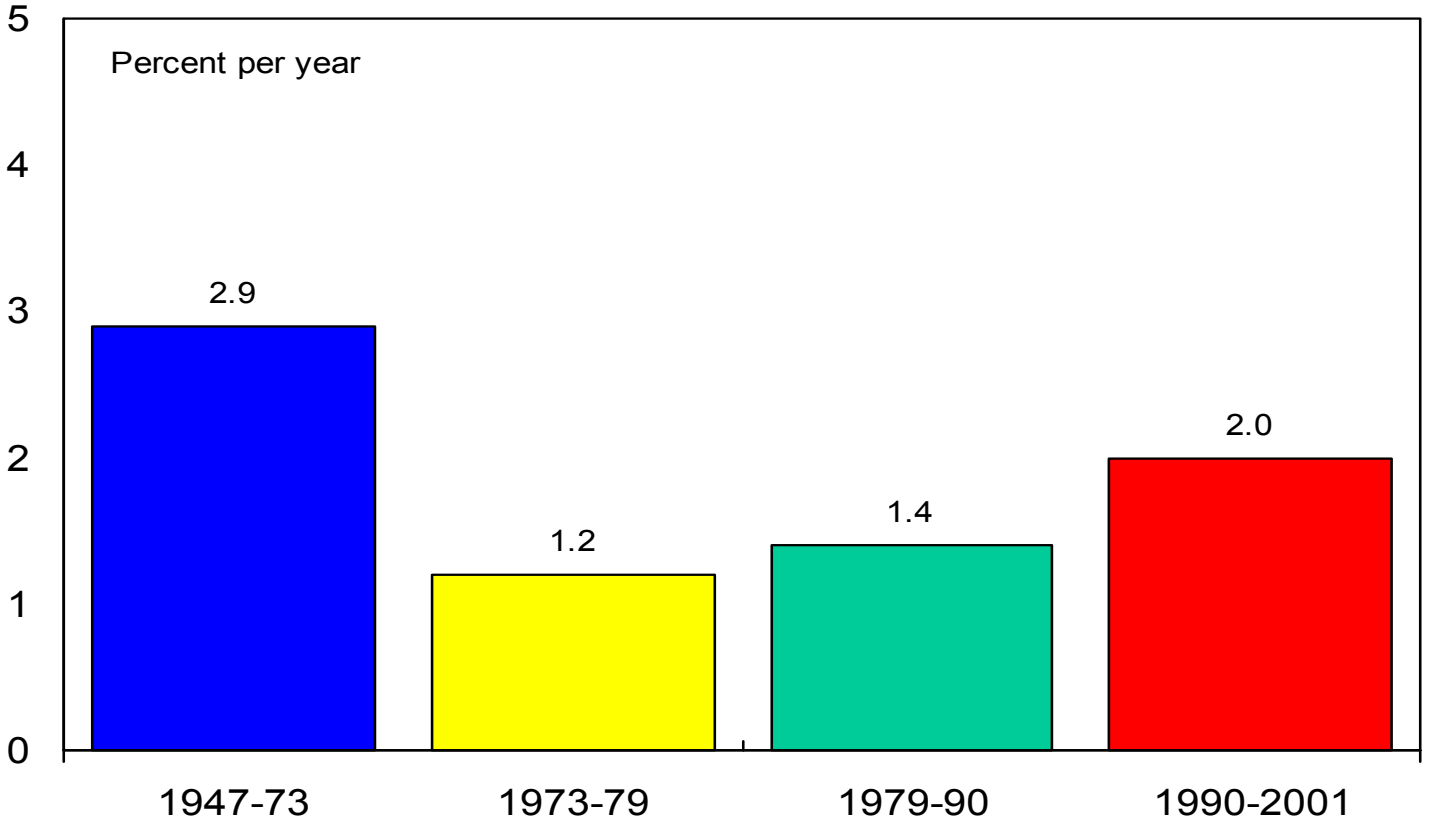
for conference on
"Shaping Our Future By Reducing Energy Intensity in the U.S. Economy"

May 14, 2002

Output per hour of all persons, nonfarm business sector, 1947-2001



Source: BLS

March 7, 2002

Causes of the post-1973 Productivity Slowdown

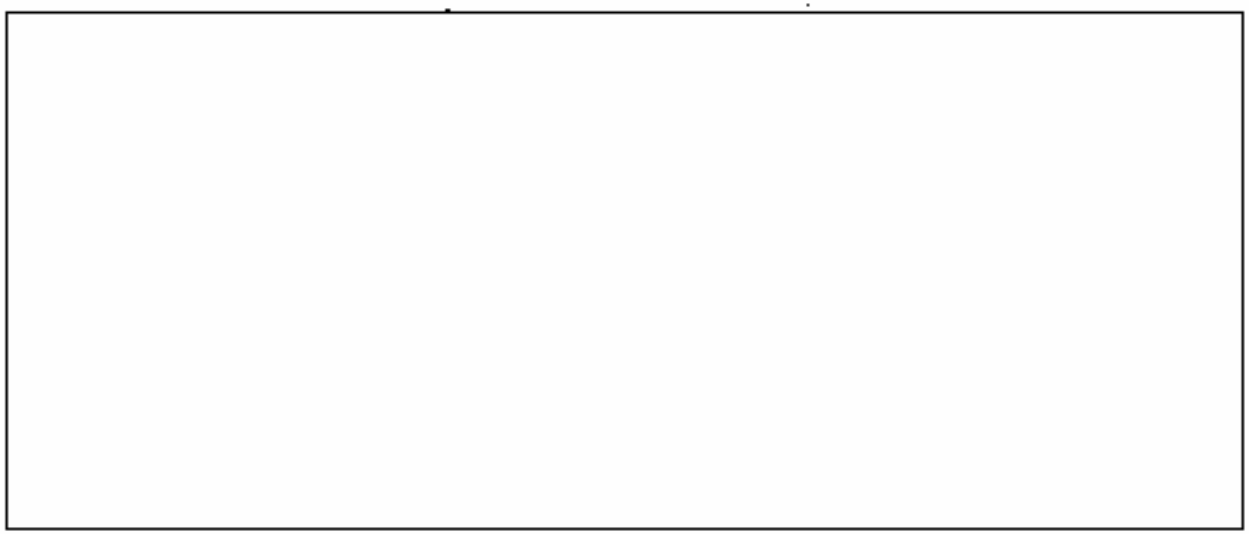
Long debated / Never resolved

Leading Hypotheses

- Slowdown in capital investment
- Change in worker attitudes
- Changes in labor composition
- Disruptions to the energy supply
- 1947-1973 was the exception, not the rule
- Growth in hard-to-measure outputs

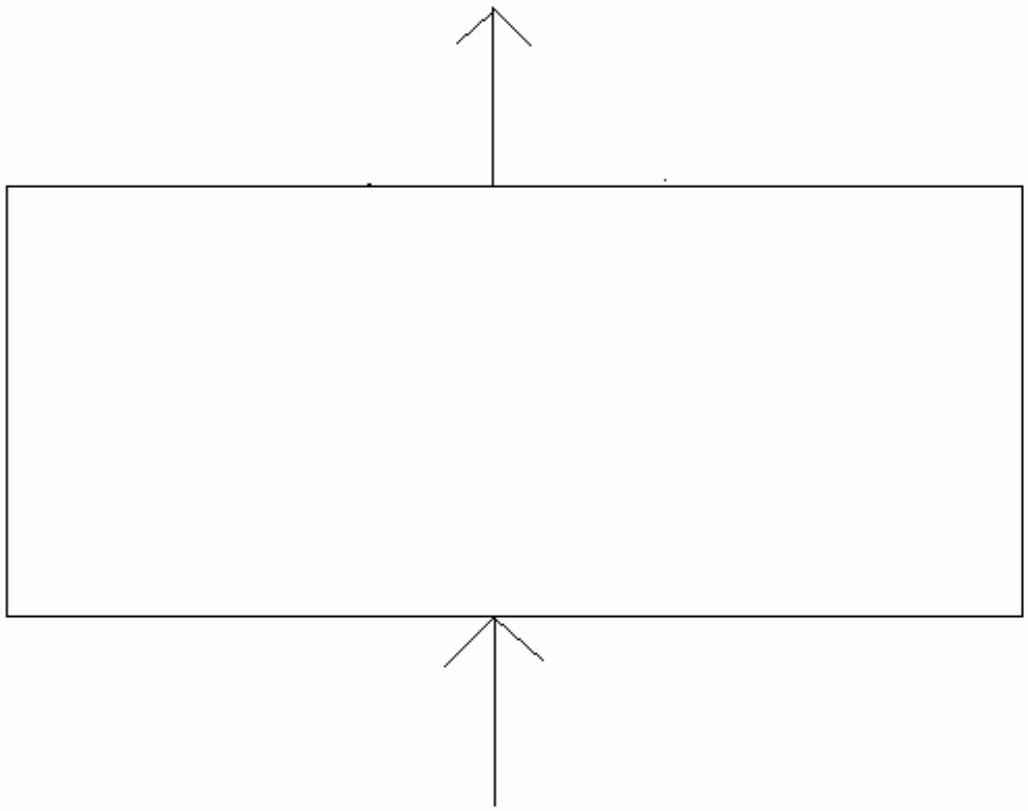
Model of the U.S. Economy

First Element: The “measured economy”, that is the sector for which we measure GDP



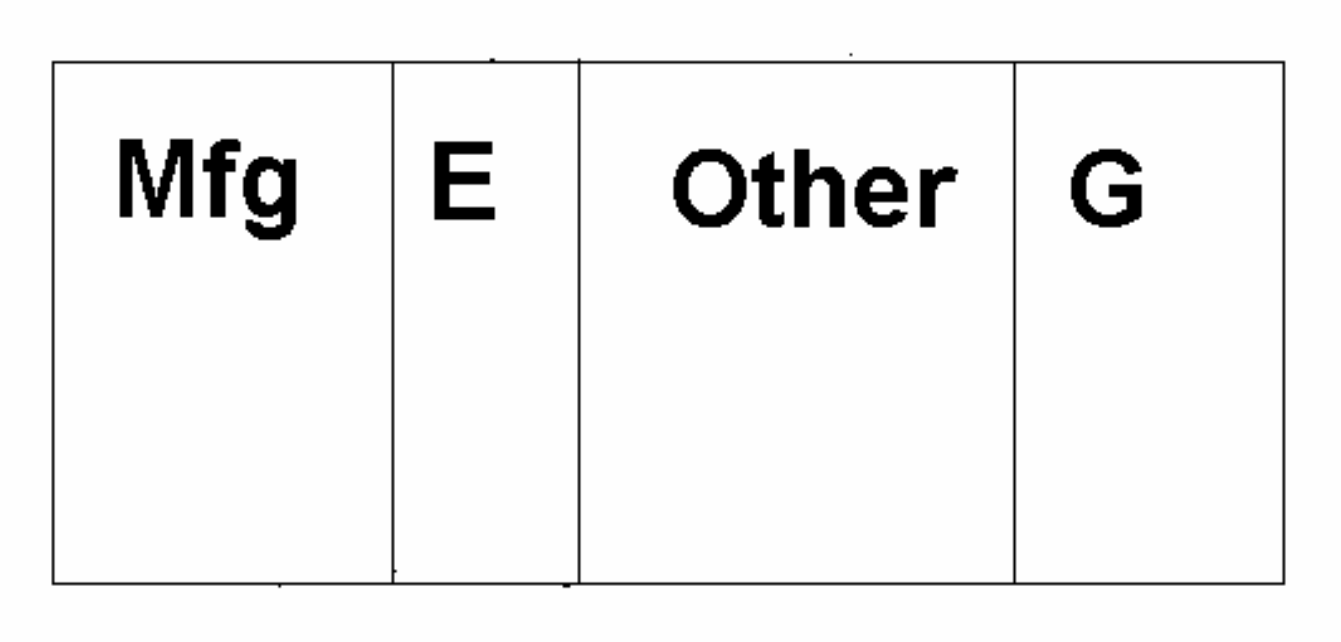
Model Elements: Flows

Outputs



Inputs

More Model Elements: Subsectors



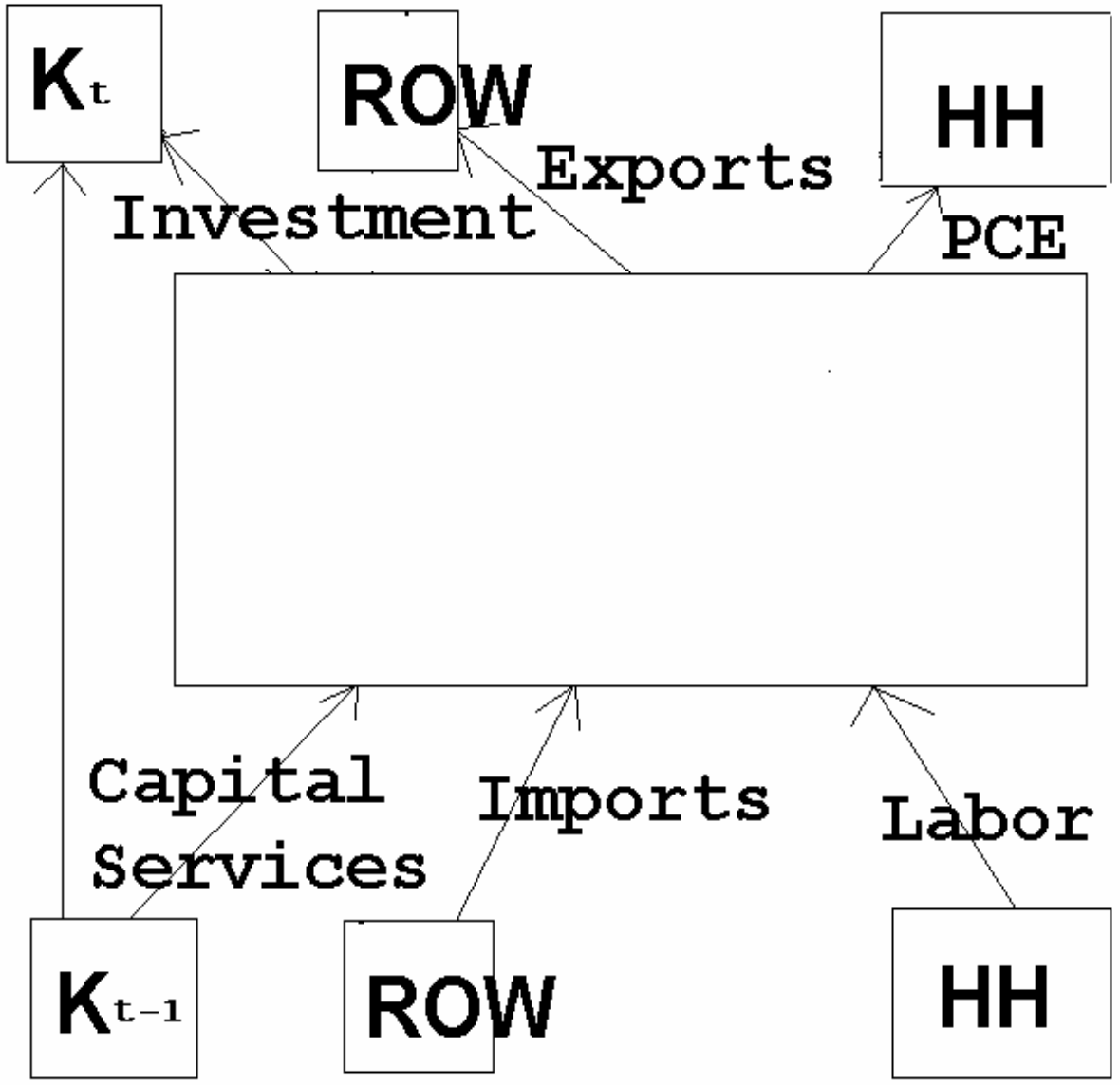
Mfg = Manufacturing, Except Energy
E = Energy Sector (Activities from Mining, Mfg, Transportation, Utilities, and Trade)
Other = Services and Goods, Except Mfg and E
G = Government

More Model Elements: Other Sectors

K = Capital

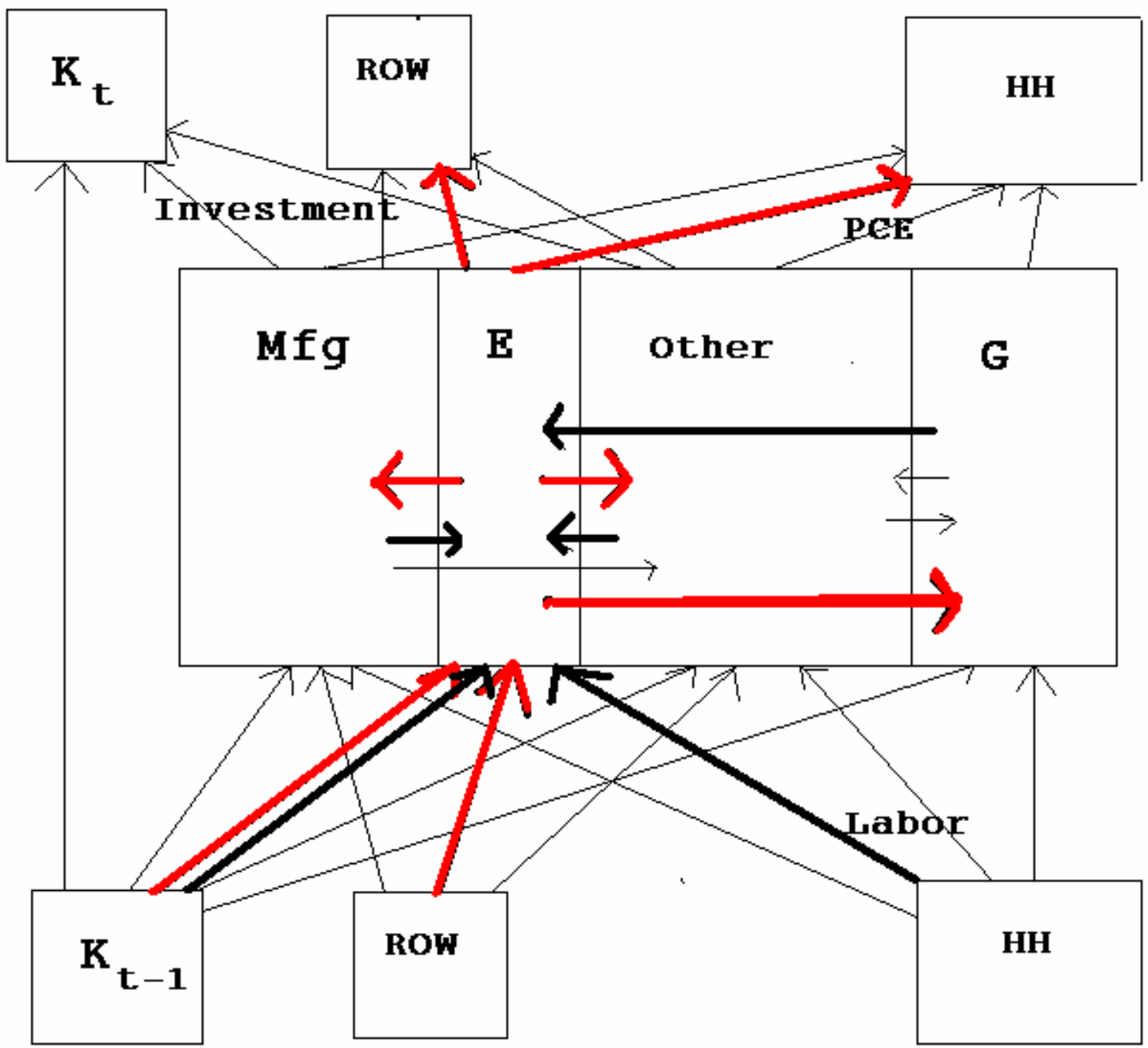
ROW = Rest of the World

HH = Households



Many flows

Many choices by many agents

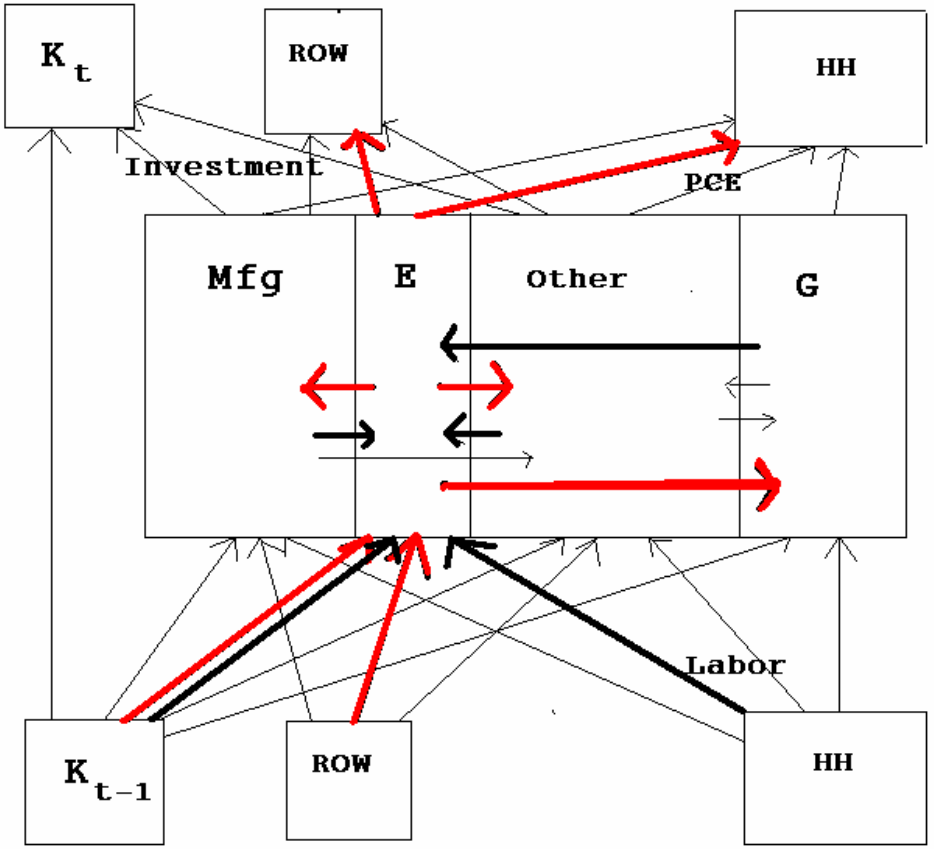


Choices by the energy sector: Alternative types of fuels and alternative sources

From Capital (U.S. Natural Resources)
From Imports

Choices by energy users

Non-energy sub-sectors: productivity
Households



BLS Data on Energy and Productivity

Confined to fuel inputs into manufacturing

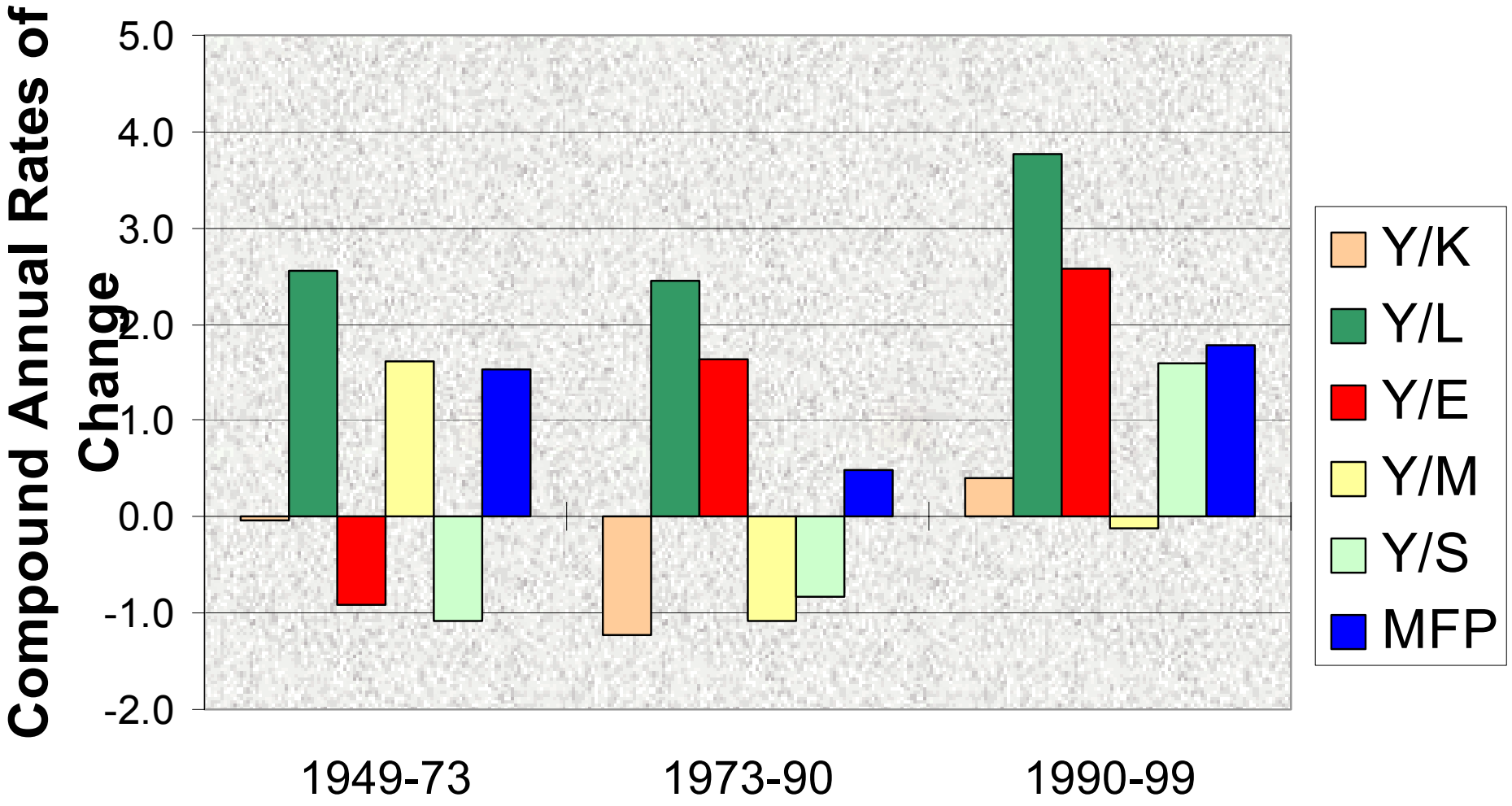
There we have the MECS data from EIA

Fuels are weighted by cost shares

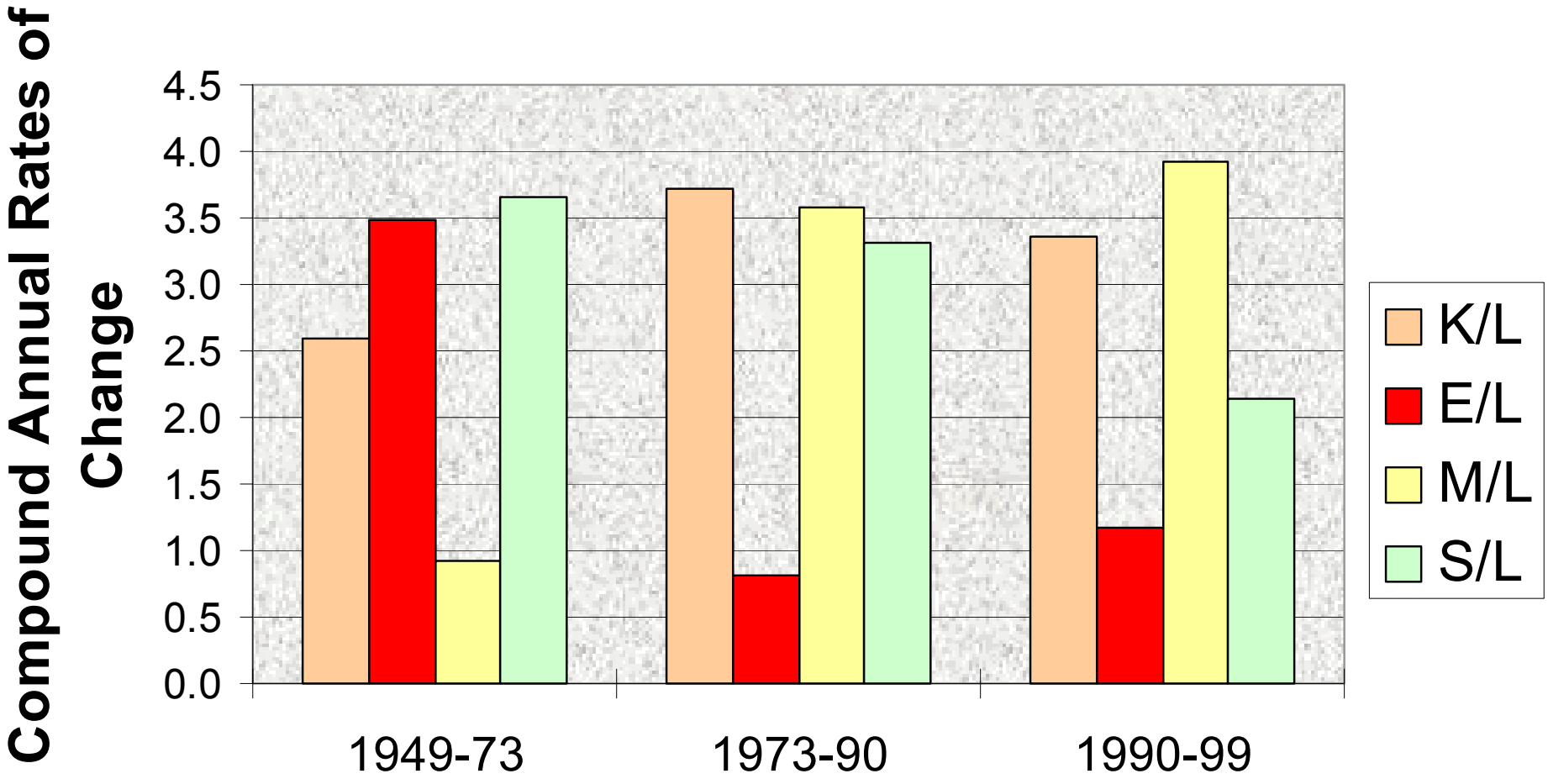
Data on output and on five types of inputs and their prices: “KLEMS”

Data permit examination of energy inputs in the context of a model of production

Factor Productivity in U.S. Manufacturing



Factor Intensity in U.S. Manufacturing: Factor Growth Rates Relative to Labor



Factor Prices Relative to Output Prices in U.S. Manufacturing